UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,976	02/13/2002	Robert J. Hariri	011307	1042

20583 7590 03/22/2007

JONES DAY
222 EAST 41ST ST
NEW YORK, NY 10017

EXAMINER	
LI, QIAN JANICE	
ART UNIT	**PAPER NUMBER**
1633	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/074,976	HARIRI, ROBERT J.	
	Examiner	Art Unit	
	Q. Janice Li, M.D.	1633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24-28,30-45 and 51-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-28,30-45 and 51-54* is/are rejected.

7)☒ Claim(s) *55-57* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The amendment, and remarks filed 1/10/07 are acknowledged. Claims 24, 30, 31, 41-45 have been amended, claims 29, 46-50 have been canceled, and claims 51-57 are newly submitted. Claims 24-28, 30-45, 51-57 are under current examination. Unless otherwise indicated, previous rejections that have been rendered moot in view of the amendment to pending claims and new grounds of rejections will not be reiterated.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

The prior rejection of claims 24-27, 31-36 under 35 U.S.C. 102(e) as being anticipated by *Pykett et al* (USP 6,548,299), is withdrawn in view of the claim amendment.

Claims 24-28, 30-37, 40-45, 51, 52, 54 are newly rejected under 35 U.S.C. 102(b) as being anticipated by *Naughton et al* (USP 5,962,325).

Given the broadest reasonable interpretation, the claims are drawn to manufacturing a tissue matrix comprising seeding human CD34-, SSEA3-, SSEA4- stem cells, stem cells defined by these markers embrace mesenchymal stem cells, which are known to be CD34-, SH1+, SH2+, or SH4+, and SSEA3-, SSEA4-.

Naughton et al teach a method of producing a tissue matrix comprising a three-dimensional matrix seeded with mesenchymal stem cells, and the tissue matrix generated by the method (e.g. claims 1-20); wherein the matrix tissue is biocompatible, made of synthetic or natural decellularized materials (e.g. § 5.1), and are enveloped with proteins naturally secreted by MSCs including fibronectin (e.g. claim 1), and may further coated with heparin, etc. (e.g. column 13, lines 11-20). *Naughton et al* also teach seeding bone marrow or cord blood cells (comprising CD34+ cells) in the matrix framework (e.g. the abstract). Accordingly, *Naughton et al* anticipate instant claims.

It is noted in this and following rejections, the cited prior art differs from instant claims in the method of obtaining stem cells defined by the recited markers. However, patentability of a product-by-process claim is determined by the novelty and nonobviousness of the claimed product itself without consideration of the process for

making it which is recited in the claims, and a product-by-process claim may be properly rejectable over prior art teaching the same product produced by a different process, if the process of making the product fails to distinguish the two products. *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

Claims 24-27, 30, 32-37, 40-45, 51, 52, 54 are newly rejected under 35 U.S.C. 102(e) as being anticipated by *Dodnar et al* (USP 6,800,480).

Given the broadest reasonable interpretation, the claims are drawn to manufacturing a tissue matrix comprising seeding human CD34- and OCT-4+ stem cells, which stem cells embrace embryonic stem/germ cells, which are known to be CD34-, OCT-4+, and CD45-.

Dodnar et al teach a method of producing a tissue matrix comprising extracellular matrix free of cells seeded with primate embryonic (primordial) stem cells, and the tissue matrix generated by the method (e.g. claims 1, 2, 39); wherein the matrix tissue comprises fibronectin and heparin (e.g. claim 4). Accordingly, *Dodnar et al* anticipate instant claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 31 is newly rejected under 35 U.S.C. 102(e) as being obvious over *Dodnar et al* (USP 6,800,480), in view of *Pykett et al* (USP 6,548,299).

The teaching of *Dodnar et al* was detailed *supra*, but *Dodnar et al* do not teach further seeding CD34+ stem cells in the ES cell matrix. However, the need and means for seeding CD34+ hematopoietic stem cells in a biocompatible matrix was well known in the art as taught by *Pykett et al.*

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method taught by *Dodnar et al* and *Pykett et al* by seeding both ES cells and CD34+ stem cells for lymphoid tissue regeneration, with a reasonable expectation of success. Given the state of the art, these limitations fall within the bound of optimization. Thus, the claimed invention as a whole was *prima facie* obvious in the absence of evidence to the contrary.

Claims 38-40 stand or newly rejected under 35 U.S.C. 103(a) as being unpatentable over *Dodnar et al* (USP 6,800,480) or *Naughton et al* (USP 5,962,325), in view of *Goldstein et al* (USP 5,899,936), and *Atala* (USP 6,753,181).

The teaching of *Dodnar et al* or *Naughton et al* was discussed *supra*, but they do not teach the ratio of the fibronectin to heparin, or the details of how the stem cells are seeded on the matrices.

Goldstein et al and *Atala* supplemented *Dodnar et al* or *Naughton et al* by establishing that it was well known in the art the optimal ratio of the fibronectin to heparin for coating a bioprosthesis ranges from 0.1:1 to 10:1 (e.g. column 9, lines 7-17)

and the process of decellularization of a natural tissue for making an implant. As to how the stem cells are seeded, *Dodnar et al* or *Naughton et al* do not literally state how this was done. However, given the state of the art, the multiple means of seeding would have been common practice to one ordinary skilled in the art.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method taught by *Dodnar et al* or *Naughton et al, Goldstein et al*, and *Atala* by coating the matrices as taught by *Dodnar et al* or *Naughton et al* in an appropriate ratio of fibronectin to heparin as taught by *Goldstein et al* and decellularizing the matrix as taught by *Atala*, with a reasonable expectation of success. Given the state of the art, these limitations fall within the bound of optimization. Thus, the claimed invention as a whole was *prima facie* obvious in the absence of evidence to the contrary.

Claim Objections

Claims 55-57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

No claim is allowed.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Q. Janice Li** whose telephone number is 571-272-0730. The examiner can normally be reached on 9:30 am - 7 p.m., Monday through Friday, except every other Wednesday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Joseph Woitach** can be reached on 571-272-0739. The **fax** numbers for the organization where this application or proceeding is assigned are **571-273-8300**.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is **(866) 217-9197**. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent

Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at **800-786-9199**.

Q. JANICE LI, M.D.
PRIMARY EXAMINER

Q. Janice Li, M.D.
Primary Examiner
Art Unit 1633

QJL
March 8, 2007